

## CLAIMS

What is claimed is:

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1. A method for transmitting facsimile data over a channel, comprising:  
receiving a frequency shift keying (FSK) signal;  
using the FSK signal to estimate the channel to obtain a channel  
estimation;  
10 determining a preemphasis shaping filter based on the channel  
estimation;  
applying the preemphasis shaping filter to the facsimile data to produce  
filtered facsimile data; and  
transmitting the filtered facsimile data over the channel.
- 15 2. The method of claim 1, wherein the step of using the FSK signal to estimate  
the channel comprises:  
determining an average signal power of the FSK signal.
- 20 3. The method of claim 2, wherein determining the preemphasis shaping filter  
comprises:  
using the average signal power of the FSK signal to select a preemphasis  
shaping filter corresponding to the channel.

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4. The method of claim 2, wherein the step of determining the preemphasis shaping filter comprises:
- using the average signal power of the FSK signal to calculate coefficients for the preemphasis shaping filter corresponding to the channel.

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5. The method of claim 1, further comprising receiving an answer tone and wherein using the FSK signal to estimate the channel comprises using the answer tone and the FSK signal to estimate the channel to obtain the channel estimation.

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6. The method of claim 5, wherein using the answer tone and the FSK signal to estimate the channel comprises:
- determining an average signal power for each one of answer tone and the FSK signals.

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7. The method of claim 6, wherein determining the preemphasis shaping filter comprises using the average signal power for each one of the answer tone and the FSK signal to select or calculate a preemphasis shaping filter corresponding to the channel.

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8. The method of claim 5, wherein using the answer tone and the FSK signal to estimate the channel comprises:

- using the answer tone and FSK signal to estimate post-channel spectral characteristics of the answer tone and FSK signal;

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- using the answer tone and FSK signal to estimate pre-channel spectral characteristics of the answer tone and FSK signal; and



comparing the pre-channel spectral characteristics with the post-channel spectral characteristics to obtain the channel estimation.

5 9. The method of claim 1, wherein using the FSK signal to estimate the channel comprises:

using the FSK signal to estimate post-channel spectral characteristics of the FSK signal;

using the FSK signal to estimate pre-channel spectral characteristics of the FSK signal; and

10 comparing the pre-channel spectral characteristics with the post-channel spectral characteristics to obtain the channel estimation.

15 10. The method of claim 9, wherein the post-channel spectral characteristics are estimated over a continuous time period at a plurality of different frequencies.

20 11. The method of claim 9, wherein:

the post-channel spectral characteristics include modifications introduced

by the channel after transmission from a receiver terminal, wherein

25 the receiver terminal receives the facsimile data transmission, and

the pre-channel spectral characteristics do not include modifications

introduced by the channel after transmission from the receiver terminal.



12. The method of claim 9, wherein determining the preemphasis shaping filter comprises:

calculating coefficients of the preemphasis shaping filter based on the channel estimation.

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13. The method of claim 9, wherein determining the preemphasis shaping filter comprises:

obtaining coefficients of the preemphasis shaping filter from a lookup table based on the channel estimation.

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14. A facsimile modem transmitter which transmits facsimile data over a channel, comprising:

a frequency shift keying (FSK) detector having an input coupled to the channel which receives FSK signals;

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a pre-channel spectral unit coupled to the FSK detector, and having an output which provides a pre-channel spectral estimation of the FSK signals;

a post-channel spectral unit having an input coupled to the channel which receives FSK signals, and an output which provides a post-channel spectral estimation of the FSK signals;

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a compare unit having a first input which receives the pre-channel spectral estimation and a second input which receives the post-channel spectral estimation, and an output which provides a channel estimation based at least in part on a comparison of the pre-channel spectral estimation and the post-channel spectral estimation; and

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a filter generating unit having an input which receives the channel estimation and an output which provides coefficients corresponding to a preemphasis shaping filter.

5 15. The facsimile modem transmitter of claim 14, wherein:

the FSK detector comprises an FSK decoder having an input which receives the FSK signals, and

the pre-channel spectral unit further comprises:

an FSK transmitter coupled to the FSK decoder, and

an estimator coupled to the FSK transmitter for estimating the pre-channel spectral estimation of the FSK signals.

10 16. The facsimile modem transmitter of claim 15, further comprising:

an answer tone detector having an input coupled to the channel which receives an answer tone; and

15 wherein the pre-channel spectral unit is coupled to the answer tone detector and the output of the pre-channel spectral unit provides a post-channel spectral estimation of the answer tone and FSK signals.

20 17. The facsimile modem transmitter of claim 15, wherein the facsimile modem transmitter comprises a software facsimile modem transmitter, the software facsimile modem transmitter comprising the FSK detector, the pre-channel spectral unit, the post-channel spectral unit, the compare unit, and the filter generating unit.

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18. A facsimile modem transmitter which transmits facsimile data over a channel, comprising:

a frequency shift keying (FSK) detector having an input coupled to the channel which receives FSK signals and having a first output which provides a control signal;

an average signal power unit having a first input coupled to the channel and a second input which receives the control signal, and an output which selectively provides an average signal power at each FSK signal frequency based on the control signal; and

a filter generating unit having inputs which receive the average signal power at each FSK signal frequency and an output which provides coefficients corresponding to a preemphasis shaping filter.

19. The facsimile modem transmitter of claim 18, wherein the FSK detector further comprises:

an answer tone detector having an input coupled to the channel which receives an answer tone, wherein the control signal is based on the FSK signals and the answer tone; and

wherein the average signal power unit selectively provides an average signal at an answer tone frequency based on the control signal, the answer tone frequency corresponding to the answer tone.

20. The facsimile modem transmitter of claim 18, wherein the facsimile modem transmitter comprises a software facsimile modem transmitter, the software facsimile modem transmitter comprising the FSK detector, the average signal power unit, and the filter generating unit.



21. In a facsimile modem transmitter, a method for transmitting facsimile data from a facsimile modem over a channel, comprising:

receiving a plurality of signals from a receiver terminal, wherein the

5 receiver terminal is for receiving the facsimile from the facsimile modem transmitter;

in response to receiving the plurality of signals, the facsimile transmitter using the plurality of signals to estimate the channel to obtain a channel estimation;

10 determining a preemphasis shaping filter based on the channel estimation;

applying the preemphasis shaping filter to the facsimile data; and transmitting the filtered facsimile data to the receiver terminal.

15 22. The method of claim 21, wherein the plurality of signals are used for other purposes outside of channel estimation.

23. The method of claim 22, wherein the plurality of signals do not include coefficients corresponding to the preemphasis shaping filter.

20 24. The method of claim 21, wherein:

portions of the plurality of signals are modified by the channel after being transmitted by the receiver terminal, and

25 using the plurality of signals to estimate the channel comprises using the modified portions of the plurality of signals to obtain the channel estimation.



25. A facsimile modem transmitter for transmitting facsimile data over a channel stored via computer readable media, comprising:  
a first set of instructions for receiving frequency shift keying (FSK) signals;  
a second set of instructions for using the FSK signals to estimate the channel to obtain a channel estimation;  
a third set of instructions for determining a preemphasis shaping filter based on the channel estimation;  
a fourth set of instructions for applying the preemphasis shaping filter to the facsimile data; and  
a fifth set of instructions for transmitting the filtered facsimile data.

26. The facsimile modem transmitter of claim 25, further comprising:  
a sixth set of instructions for determining an average signal power for each one of the FSK signals; and  
a seventh set of instructions for using the average signal power for each one of the FSK signals to select or calculate a preemphasis shaping filter corresponding to the channel.

27. The facsimile modem transmitter of claim 25, further comprising a sixth set of instructions for receiving an answer tone, and the second set of instructions comprises a seventh set of instructions for using the answer tone and the FSK signals to estimate the channel to obtain the channel estimation.



28. The facsimile modem transmitter of claim 25, further comprising:

- a sixth set of instructions for using the FSK signals to estimate post-channel spectral characteristics of the FSK signals;
- a seventh set of instructions for using the FSK signals to estimate pre-channel spectral characteristics of the FSK signals; and
- an eighth set of instructions for comparing the pre-channel spectral characteristics with the post-channel spectral characteristics to obtain the channel estimation.

29. A facsimile modem transmitter for transmitting facsimile data over a channel stored via computer readable media, comprising:

- a first set of instructions for receiving a plurality of signals from a receiver terminal, wherein the receiver terminal receives the facsimile data transmission;
- a second set of instructions for using the plurality of signals, in response to receiving the plurality of signals, to estimate the channel to obtain a channel estimation;
- a third set of instructions for determining a preemphasis shaping filter based on the channel estimation;
- a fourth set of instructions for applying the preemphasis shaping filter to the facsimile data; and
- a fifth set of instructions for transmitting the filtered facsimile data to the receiver terminal.



30. The facsimile modem transmitter of claim 29, wherein:

portions of the plurality of signals are modified by the channel after being  
transmitted by the receiver terminal, and

the second set of instructions comprises a sixth set of instructions for

5 using the modified portions of the plurality of signals to obtain the  
channel estimation.

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